A NOTE FROM THE AUTHOR

I've been researching, studying, and writing about nutrition, health, and fitness for a long time. I've personally corresponded with tens of thousands of people looking to improve their diet and fitness levels and lose weight. In many respects, I feel like I've seen and heard it all; however, I'm absolutely certain there's still a lot out there for me to learn, and this presents an infinite number of opportunities to grow intellectually and expand my knowledge base. These yet-to-be-discovered opportunities excite and fuel my desire to keep exploring and creating as I work to help others find answers to health challenges they so desperately want or need.

As much as I've tried to understand new scientific concepts and principles, I've always strived to understand the concerns and feedback of everyday people who are hungry to make positive changes so they can lead healthier, more satisfying lives. However, there are some things that have stumped me along the way. One of those things has been the assortment of statements I've heard from many people over the years in reference to carbs. "I can just look at carbs and gain weight." "Carbs and I simply don't get along." "The second I eat carbs my body starts gaining weight." Maybe you too have made one of these statements or share the sentiments they convey. Well, you're not alone, and honestly, I never fully grasped the underpinnings of these statements—until *now*!

Months before I decided to write this book, I came across a term I had never heard before—"metabolic flexibility." It looked and sounded scientifically cool, and I was excited to read about it to see what it meant. After very quickly learning the definition and physiologic underpinning of this term, I thought about those carb statements I'd been hearing for years but never fully understood. Metabolic flexibility addresses the body's ability (or inability) to switch from burning carbs to burning fats and vice versa. I had one of those eureka moments as the last twist of the bulb finally turned on the light in my brain. What all of these people (and I'm sure millions of others) have been feeling and describing is a state of metabolic inflexibility. It isn't necessarily that the carbs themselves are bad, but rather that their bodies have a difficult time processing them effectively and efficiently. That's why they feel the way they do when eating carbs.

When you put the wrong oil in a car's engine or the engine isn't given proper care and maintenance, its performance level starts to diminish, and you eventually begin to feel this operational decline while driving the car. If the problem or problems aren't corrected before too much damage is done, the engine simply dies, and you have a huge, costly problem on your hands. Well, millions of people are driving a car (their body) whose engine (their metabolism) is sputtering and triggering warning lights that are either going unrecognized or being purposely ignored. **The Met Flex Diet** is a program that will tune up your engine so you can not only lose weight but also operate at peak performance to hold off disease and cover hundreds of thousands of miles of open road before it's time for a check-in with the mechanic. In fact, with this six-week program, you become your own mechanic and wrestle with your destiny so that it falls back under your control—exactly where it should be.

Ian K. Smith, M.D.
April 2023

1

WHAT IS METABOLIC FLEXIBILITY?

To understand the concept of metabolic flexibility, you first must understand the concept of metabolism. There's no doubt in my mind that everyone reading this book has heard the word "metabolism"; however, many of you might not understand exactly what it means and what its full array of implications are for your health. So let's get a basic understanding of this critical physiologic concept that can have a tremendous impact not just on that number you see on the scale but on how you actually look and feel.

METABOLISM

If asked what the word "metabolism" means, most people would say, "How fast my body can burn calories." That basic understanding still holds true. However, your metabolism isn't some magical thing inside of your body that just chews up calories, nor is it an organ, like the heart, lungs, or liver. Rather, your metabolism is the collective effort of billions of cells in your body that are carrying out chemical processes (work) every second of your life—even when you're sleeping—that allow you to live and function and be who you are. Just as a

lawn mower requires fuel or a battery to operate and a washing machine needs some type of power source to turn on and spin, the billions of cells that make up your body require energy to do all of the amazing things they do. These chemical processes make up what we call a person's metabolism, and they can be quite complicated. Your cells need energy to do what they do, and one of the ways they get their energy is by converting the food you eat into energy. Just as height is measured in feet and inches, energy also has a way of being measured, in what we call calories. When you read on the back of a yogurt container that it contains 150 calories, what you're being told is that the yogurt is storing 150 units of energy (calories) that your body can use after it breaks the food down in your digestive system.

Your metabolism is constantly working. Throughout the day it operates at different intensity levels. It's active when you're sleeping, but not as active as when you're walking or climbing steps or taking a shower. It's active even when you are in a deep sleep and your body is at rest, because you still need energy to power the activities that keep you alive: your heart is still beating, your lungs are still breathing, and your blood is still circulating throughout your body. Your metabolism provides you with energy for small functions, such as sending neurologic messages from your brain to the rest of your body, as well as large functions, such as digesting food, keeping your body temperature in a normal range, and many other processes that occur every second of every day of your life.

Metabolism can be separated into two major branches of activities—catabolism and anabolism. Catabolism is typically defined as a process of breaking down. A series of reactions occur that take relatively large molecules and break them down into smaller ones. During this breakdown, energy is released that the cells in your body can use to carry out their functions. A critical catabolic process in the body is digestion. When you eat food, your body needs to break it down into

small, simple nutrients that can be used to fuel your daily activities of living.

Anabolism, the second and equally important branch of your metabolism, is exactly the opposite of catabolism. Anabolic processes take smaller units, like the amino acids from food, and bind them together to create larger structures called protein. In other words, your body takes the energy that is released through catabolism and uses it to build relatively large, complex molecules.

A term most people have heard and are typically concerned about is "metabolic rate." This is the rate at which your body burns energy in a certain period. When people say they have a "fast metabolism," they're typically referring to the metabolic rate, which, as you now know, is just part of the entire metabolism picture. Metabolic rate determines how fast your body can use, or "burn," the calories that come from food. If you have a slow metabolic rate, then it would follow that you don't burn through the calories from that piece of cake as quickly as other people with a faster metabolic rate. You are more likely to gain weight because, if you have energy you can't use, then your body has to do something with it, and that means storing it in the form of fat.

Understanding our metabolism has been a key concept in trying to understand the rates at which we gain weight and why two people of similar weight, musculature, height, and other characteristics can eat the same number of calories per day and have the same level of physical activity, yet one of them gains weight faster than the other. We have always pointed to the difference in their metabolism or metabolic rate as a central explanation for the difference in weight gain—or in some cases weight loss—between them.

The conventional wisdom has always held that as we age our metabolism slows down—specifically that around the age of 30 our metabolic rate really begins to take a nosedive, then continues slowing down every year. This continual metabolic rate decline has been highlighted as the major

contributing factor to the weight gain many experience as they get older. It's also been widely accepted that as women near menopause their metabolism slows dramatically. What we have long believed to be indisputable facts about metabolism, however, have actually been largely refuted by a major paper titled "Daily Energy Expenditure through the Human Life Course," published in the journal *Science* in August 2021. Among the many findings reported in the paper, one of the most significant is that metabolism has four distinct life stages and differs for all people across these stages.

The Four Stages of Metabolism

1. Infancy up until age 1: Calorie burning is at its peak and accelerates until it's 50 percent above the adult rate.
2. From age 1 until around age 20: Metabolism gradually slows by approximately 3 percent a year.
3. Ages 20 to 60: Metabolism holds relatively stable.
4. After age 60: Metabolism declines about 0.7 percent a year.

These researchers also found that despite what many have advocated and believed over the years, there really aren't any differences in metabolism between men and women when we control for body size and the amount of muscle people have. They also note that these findings apply to the general population, but of course there are individual cases that can be regarded as exceptions to the rules. Some people have metabolic rates that are about 25 percent below the average for their age, while others have a rate that can be 25 percent above average. Regardless, metabolism for the vast majority of peo-

ple tends to be within a certain range, thus throwing a huge bucket of water on the belief that metabolism alone is the difference in why people gain and lose weight at different rates.

Despite this new evidence suggesting that there are no wide differences in metabolic rates for most of the population, there's also important evidence that we can alter our metabolic rate. Although this rate alteration might not be permanent, there are ways to make it go high enough for a long enough period of time to make a difference in how we burn or use food calories and store fat. Think about driving your car down a highway and setting it on cruise control. Your car will do whatever it needs based on the road conditions to keep the car moving at the speed that you've set. When you're going uphill, your car will work harder to keep the pace, and conversely, your car will back the engine off and allow gravity to do more of the work of keeping the pace going downhill. When you press the gas pedal, the car will go faster than the cruise speed you set. It will stay at the higher speed as long as you're pressing the pedal, but when you stop pressing, the vehicle will gradually slow down and then reengage the set cruise control speed. Your metabolism works the same way. Like most people, you have a genetically determined metabolic rate that is like your cruise control speed that keeps you motoring along. There are things you can do, however, that will temporarily boost your metabolic rate—the equivalent of pressing the gas pedal to make your car go faster. The good news is that while you don't have control of your genetically determined metabolic rate, you do have control over some of these metabolic boosters.

Metabolic Boosters

- Increase protein consumption
- Work out with high-intensity interval training (HIIT)

- Build more lean muscles
- Drink more water
- Snack often
- Increase B12 consumption

Although metabolism is still not fully understood, its implications for how we gain and lose weight and its impact on our overall health have never been more important in our need to prevent and identify causes for various conditions. The National Center for Advancing Translational Sciences currently recognizes more than 500 metabolic disorders, albeit many of them are rare. The health of our metabolism is just one factor in the more global concept of our overall metabolic health. The prevailing definition of metabolic health is having ideal levels of blood sugar, triglycerides, high-density lipoprotein (HDL) cholesterol, blood pressure, and waist circumference, without using medications. Why do these specific factors matter? Researchers have shown that they directly relate to our risk for diabetes, heart disease, and stroke. In fact, a 2019 seminal study on metabolic health published by researchers from the University of North Carolina at Chapel Hill found that only 12 percent (one out of eight) of US adults have optimal metabolic health.[1] This obviously does not paint a flattering picture of where we stand with regard to metabolic health, but where there's a challenge, there's also tremendous opportunity. The Met Flex Diet program has been constructed to help you create and take advantage of this opportunity.

METABOLIC FLEXIBILITY

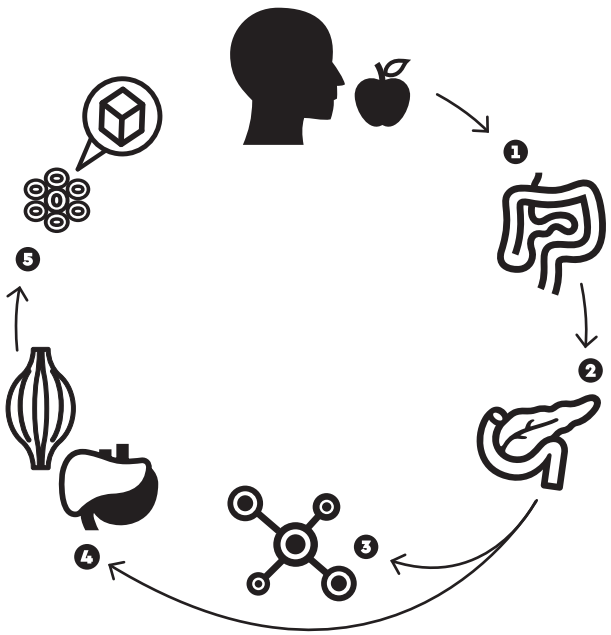
The "Met Flex" in the title of this book stands for "metabolic flexibility." Simply defined, metabolic flexibility is the ability of the body's cells to effectively switch between the fuel sources they use to power their activities. The two major fuel sources for the body are carbohydrates and fats. You're considered

metabolically flexible when you can burn either fuel efficiently when it's available. An analogy that might explain this better is that between a hybrid car and a traditional gasoline-powered car. A hybrid electric car has both a battery and a fuel tank. The car can be operated on battery power, but when the battery is almost depleted, it switches to gas from the fuel tank as its energy source. A hybrid car represents the metabolically flexible state, because it can use whatever power source is available. A gasoline-powered car, however, can only use gas as its power source. Unfortunately, once the gas tank is empty, the car can no longer run until more fuel is pumped into it. A car with no ability to switch and use another power source would be considered metabolically inflexible.

Our bodies typically prefer to burn fuel in the form of the food we consume, which is broken down in our digestive tract into basic nutrients such as carbohydrates (glucose), fat, and protein. We eat food, digest it, extract energy from it, and then carry out our daily functions of living. What happens when we have depleted all of the energy from the food we've eaten and we don't eat again for a while? Our body still needs energy to function, even if we're just lying in bed. Our heart is still pumping, and our lungs are still expanding and contracting to bring vital oxygen into our bodies. We need to find other fuel sources once our food energy is gone, so the body turns to plan B—burning fat. The often-dreaded fat is not something we want around our organs (visceral fat) or underneath our skin (subcutaneous fat) not only because we may not like how we look but also because it can have detrimental effects on our health. However, fat is a stored form of energy, and when the body no longer has its preferred energy source (food) available, it turns to fat, breaks it down (catabolism), and converts it into energy units that can be used. Fat becomes our fuel source when nothing else is available, and without it we would die. We are metabolically flexible when we can burn food nutrients when they're available and use our stored fat as our fuel when they're not.

ENERGY EXTRACTION FROM FOOD

This is how the body extracts energy from food after eating. The body stores this energy in our liver and muscle in the form of glycogen when we don't burn enough of it and there's some left over.



1. Food broken down by digestive system into glucose to be used as energy.

2. Pancreas secretes the hormone insulin into the bloodstream to help transport glucose into the cells throughout the body.

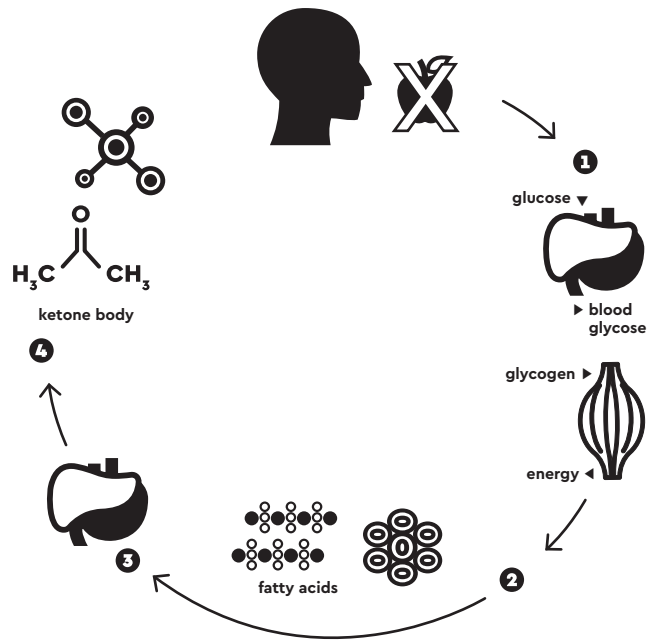
3. Insulin helps glucose from the blood to be transported into cells where it's used as energy.

4. Insulin facilitates glucose being stored in the liver and skeletal muscle in the form of glycogen.

5. Excess glucose is stored as fat to be used later when energy is needed.

FAT BURNING DURING FASTING

During the fasting state, glycogen stores in the liver and muscle are broken down and glucose is released into the blood. Once these stores are depleted, the body switches to using fat. Fatty acids are taken up by the liver and used to form ketone bodies, which are then the energy used by cells.



1. The liver and skeletal muscle are prompted to break down their glycogen stores and release glucose into the blood to be used for energy.

2. Fat cells are prompted to break down and release fatty acids into the blood.

3. Fatty acids taken up by the liver are converted to ketone bodies (ketosis), which are then released into the blood.

4. Ketone bodies are absorbed by the cells throughout the body, where they are now the new fuel source instead of glucose.

No blood test is currently available to test a person's metabolic flexibility. However, empirical data and the abundance of certain medical conditions suggest that a large number of people are metabolically inflexible. One of the biggest concerns is something called metabolic syndrome, which is the presence of three or more of five conditions: high blood pressure, high blood glucose (sugar) levels, high levels of triglycerides (a type of fat) in the blood, a large circumference around the waist (apple-shaped body), and low levels of HDL (good) cholesterol in the blood. If you have three or more of these conditions, you are at higher risk of developing diabetes, heart disease, and stroke. In fact, according to the American Heart Association, 23 percent of US adults are thought to have metabolic syndrome, a number that is extremely concerning to health care professionals.

A metabolically inflexible person is disadvantaged not only in terms of weight management but in other areas of daily functioning. Currently no tests are available that directly compute or assess metabolic inflexibility, but there are signs you should look out for that might give you some indication that things need to be improved.

Signs of Metabolic Inflexibility

- Feelings of anxiety and/or depression
- A need for some type of stimulant like coffee to function
- Difficulty losing fat
- Constant cravings despite recently eating
- Fatigue, sluggishness, or crankiness when not eating (fasting)
- Fatigue after a carbohydrate-rich meal like pasta
- Fluctuating blood sugar levels

BENEFITS OF METABOLIC FLEXIBILITY

Just as a runner can improve their time running the mile and a weightlifter can improve how many times they can lift a 50-pound dumbbell, you can improve your body's ability to switch from burning one fuel to another. You can also improve how efficiently your body burns these fuels. Awaiting you once this happens are many potential benefits, some of which are listed here. Keep these benefits in mind as you go through the Met Flex Diet program so that, if you feel challenged at some point, you can remind yourself of all the reasons why you started in the first place.

Benefits of Improved Metabolic Flexibility

- Improved weight loss and better weight management
- Improved blood sugar level control
- Increased energy levels
- Better sleep
- Better overall health
- Decreased risk of developing metabolic disease (like metabolic syndrome)
- Reduced cravings